EXHIBIT A

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SALESFORCE.COM, INC.
Petitioner

v.

WSOU INVESTMENTS, LLC d/b/a
BRAZOS LICENSING AND DEVELOPMENT
Patent Owner

U.S. Patent No. 8,369,827

"Method of Determining a Unique Subscriber from an Arbitrary Set of Subscriber Attributes"

Inter Partes Review No. 2022-00154

PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 8,369,827 UNDER 35 U.S.C. §§ 311–319 AND 37 C.F.R. §§ 42.100 *ET SEQ*.

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LIST OF CHALLENGED CLAIMS

Claim	Limitation
1.P	A method performed by a Subscriber Profile Repository (SPR) for determining a unique subscriber record from a set of subscription identifiers, the method comprising:
1.1	receiving a message including at least one subscription identifier;
1.2	for each subscription identifier of the at least one subscription identifier; determining whether the subscription identifier matches a subscriber record;
1.3	for each subscription identifier of the at least one subscription identifier; . . . and determining that the subscriber record is the unique subscriber record when each subscription identifier that matches the subscriber record matches an identical subscriber record.
2	The method of claim 1, wherein the step of determining whether the subscription identifier matches the subscriber record further comprises:
2.1	querying a subscriber record cache for the subscription identifier;
2.2	if the subscription identifier matches the subscriber record in the subscriber record cache, adding the matching subscriber record to a list of subscriber records; and
2.3	if the subscription identifier does not match the subscriber record in the subscriber record cache, maintaining the subscription identifier in a list of unfound subscription identifiers.
3	The method of claim 2, wherein the at least one subscription identifier matches the subscriber record in the subscriber record cache, and the step of determining whether the subscription identifier matches the subscriber record further comprises:
3.1	for each subscription identifier in the list of unfound subscription identifiers; querying a subscriber record database;
3.2	for each subscription identifier in the list of unfound subscription identifiers, . . . if the subscription identifier matches the subscriber record in the subscriber record database, adding the matching subscriber record to the subscriber record cache; and
3.3	for each subscription identifier in the list of unfound subscription identifiers, . . . returning an error message

Claim	Limitation
4	The method of claim 2, wherein the subscriber record cache does not include the subscriber record matching any subscription identifier, the method further comprising:
4.1	for each subscription identifier: querying a subscriber record database, and
4.2	for each subscription identifier: . . . if the subscriber record database contains the subscriber record matching the subscription identifier, adding the matching record to the subscriber record cache.
5	The method of claim 3, further comprising:
5.1	clearing the subscriber record cache when there is a change to the subscriber record database.
6	The method of claim 1, further comprising:
6.1	returning an error message when the subscription identifiers do not match any subscriber record.
7	The method of claim 1, further comprising:
7.1	returning an error message when the subscription identifiers match more than one subscriber record.
8	The method of claim 1, wherein the set of subscription identifiers comprises at least one of: an International Mobile Subscriber Identification (IMSI); a Mobile Station International Subscriber Directory Number (MSISDN); a Session Initiation Protocol Uniform Resource Indicator (SIP URI); and a Network Access Identifier (NAI).
14	A non-transitory machine-readable storage medium encoded with instructions for a Subscriber Profile Repository (SPR) to determine a unique subscriber record from a set of subscription identifiers, the machine-readable medium comprising:
14.1	instructions for receiving a message containing at least one subscription identifier;
14.2	instructions for determining, for each subscription identifier of the at least one subscription identifier, whether the subscription identifier matches a subscriber record; and
14.3	instructions for determining that the subscriber record is the unique subscriber record when each subscription identifier that matches the subscriber record matches an identical subscriber record.

Claim	Limitation
15	The non-transitory machine-readable storage medium of claim 14, wherein the instructions for determining whether the subscription identifier matches the subscriber record further comprise:
15.1	instructions for querying a subscriber record cache for the subscription identifier;
15.2	instructions for adding the matching subscriber record to a list of subscriber records if the subscription identifier matches the subscriber record in the subscriber record cache; and
15.3	instructions for adding the subscription identifier to a list of unfound subscription identifiers if the subscription identifier does not match the subscriber record in the subscriber record cache.
16	The non-transitory machine-readable storage medium of claim 15, wherein at least one subscription identifier matches the subscriber record in the subscriber record cache, and the instructions for determining whether the subscription identifier matches the subscriber record further comprise:
16.1	instructions for querying a subscriber record database for each subscription identifier in the list of unfound subscription identifiers to determine whether the subscription identifier matches the subscriber record in the subscriber database; and
16.2	instructions for adding the matching subscriber record to the subscriber record cache and returning an error message if the subscription identifier matches the subscriber record in the subscriber record database.
17	The non-transitory machine-readable storage medium of claim 16, further comprising:
17.1	instructions for clearing the subscriber record cache when there is a change to the subscriber record database.
18	The non-transitory machine-readable storage medium of claim 15, wherein the subscriber record cache contains no subscriber records matching any subscription identifier, the machine-readable storage medium further comprising:
18.1	instructions for querying a subscriber record database for each subscription identifier; and
18.2	instructions for adding a matching record to the subscriber record cache if the subscriber record database contains the subscriber record matching the subscription identifier.

Claim	Limitation
19	The non-transitory machine-readable storage medium of claim 14, further comprising:
19.1	instructions for returning an error message when the subscription identifiers do not match any subscriber record.
20	The non-transitory machine-readable storage medium of claim 14, further comprising:
20.1	returning an error message when the subscription identifiers match more than one subscriber record.
21	The non-transitory machine-readable storage medium of claim 14, wherein the set of subscriber identifiers comprises at least one of: an International Mobile Subscriber Identification (IMSI); a Mobile Station International Subscriber Directory Number (MSISDN); a Session Initiation Protocol Uniform Resource Indicator (SIP URI); and a Network Access Identifier (NAI).

I. INTRODUCTION

Patent Owner Brazos Licensing and Development ("Brazos") is a non-practicing entity, and states that it is based in Waco, Texas. Brazo recently sued Petitioner Salesforce simultaneously filing nine other litigations alleging infringement of nine separate patents. All of these patents stem from different patent families and claim different technologies.

One of those ten patents, U.S. Patent No. 8,369,827 ("the '827 patent") is the subject of the present petition. The '827 patent is directed to managing a legacy subscriber system by using a subscriber profile repository (SPR). The patent claims a rudimentary search protocol using portions of a subscriber record to identify a full record. Yet this "SPR," the alleged point of novelty for the '827 patent is precisely what it acknowledges was taught in the prior art. Specifically, the 3GPP standard, on which the '827 patent is built, expressly discloses the SPR. The '827 patent claims additional details not expressly described in the 3GPP standard, but those details are simple obvious design choices that were all expressly disclosed in the secondary references identified below. The claimed search protocols were thus well-known more than a decade prior to the filing of the '827 patent and are rendered obvious by the prior art teachings detailed below.

Accordingly, Petitioner salesforce.com, Inc. ("Salesforce" or "Petitioner") respectfully requests *Inter Partes* review of claims 1–8, 14–21 ("the challenged

claims") of the '827 patent assigned to WSOU investments LLC ("Patent Owner" or "WSOU"), pursuant to 35 U.S.C. § 311 and 37 C.F.R. § 42.100.

II. MANDATORY NOTICES

Pursuant 37 C.F.R. § 42.8(a)(1), the following mandatory notices are provided as part of this Petition.

A. Real Party-in-Interest (37 C.F.R. § 42.8(b)(1))

The real party-in-interest for Petitioner is Salesforce.

B. Related Matters (37 C.F.R. § 42.8(b)(2))

1. Related Patent Office Proceedings

There are no related Patent Office proceedings.

2. Related Litigation

WSOU is currently asserting the '827 patent against Petitioner in *WSOU Investments, LLC d/b/a Brazos Licensing and Development v. Salesforce.com, Inc.*, Case No. 6:20-cv-1167-ADA (W.D. Tex.).

C. Lead and Back-Up Counsel (37 C.F.R. § 42.8(b)(3)) and Service Information (37 C.F.R. § 42.8(b)(3)-(4))

Petitioner provides the following counsel and service information.[1] Pursuant to 37 C.F.R. § 42.10(b), a Power of Attorney accompanies this Petition.

LEAD COUNSEL	BACK-UP COUNSEL
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[1] Petitioner consents to electronic service to qewsouvsalesforce@quinnemanuel.com and the email addresses listed in the table below.

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Petitioner consents to electronic service at the email addresses listed above.

D. Payment of Fees (37 C.F.R. § 42.15(a))

The undersigned authorizes the Office to charge the fee required for this Petition for *Inter Partes* review to Deposit Account No. 50-5708. Any additional fees that might be due are also authorized.

III. REQUIREMENTS FOR INTER PARTES REVIEW

Petitioner certifies it is not barred or estopped from requesting this proceeding, the '827 patent is available for *Inter Partes* review, and the prohibitions of 35 U.S.C. §§315(a)-(b) are inapplicable.

IV. STATEMENT OF RELIEF REQUESTED FOR EACH CHALLENGED CLAIM

Petitioner respectfully requests *Inter Partes* review of the challenged claims based on the following obviousness grounds:

#	Ground for Challenge
1	Feyerabend and 3GPP render claims 1–4, 6, 8, 14–17, 19, and 21 obvious.
2	Feyerabend, 3GPP, and Zhang render claims 2–5, and 15–18 obvious.
3	Feyerabend, 3GPP, and Bland render claims 7 and 20 obvious.

V. OVERVIEW OF THE '827 PATENT

A. Technology

U.S. Patent No. 8,369,827 ("the '827 patent") is directed to managing a legacy subscriber system using a subscriber profile repository (SPR) and claims a rudimentary search protocol to identify a unique subscriber record using a set of subscription identifiers:

> 1. A method performed by a Subscriber Profile Repository (SPR) for determining a unique subscriber record from a set of subscription identifiers, the method comprising:
>
> receiving a message including at least one subscription identifier; for each subscription identifier of the at least one subscription identifier;
>
> determining whether the subscription identifier matches a subscriber record; and
>
> determining that the subscriber record is the unique subscriber record when each subscription identifier that matches the subscriber record matches an identical subscriber record.

Ex-1001 at Cl. 1; *see also id.* at Fig. 5.

The '827 patent is an alleged improvement of the 3rd Generation Partnership Project ("3GPP") to provide a "system that is interoperable with different network devices and messages." *Id*. at 1:58–60. The 3rd Generation Partnership Project provides a framework for LTE networks, in particular applying Internet Protocol (IP) on top of voice communication infrastructure. *Id*. at 1:12–47. As such the '827 patent states that there is a need for a fast and flexible means to identify a subscriber and access the record associated with that subscriber across a wide variety of devices. *Id*. at 1:66–2:54.

The '827 patent acknowledges that a database called the "subscriber profile repository," or "SPR," is disclosed by technical specifications of the 3GPP but asserts that the specifications "do not specify any details associated" with processing

requests for subscriber records from the SPR. *Id*. at 1:28-62. This is important, because the SPR is the primary focus of the claims, indeed, many of the limitations are directed to various functionality of the SPR. As such, it purports to introduce the claimed search protocol for identifying unique subscriber records in an SPR through the use of one or more subscription identifiers, including International Mobile Subscriber Identification (IMSI) numbers. *See id.* at 2:2–54, 5:20–28. The search protocol in question, however, was well known more than a decade prior to the filing of the '827 patent, and the prior art teachings detailed below render them obvious.

B. Priority Date

Because the prior art cited in this Petition predates the earliest possible priority date of the '827 patent (June 4, 2010) by at least one year, each cited reference herein qualifies as prior art under at least one of pre-AIA 35 U.S.C. 102(a), (b), and/or (e).

C. Prosecution History

The '827 patent was filed on June 4, 2010. Ex. 1002 at 1. After a preliminary amendment on June 4, 2010, *id*. at 57, the application was allowed on September 24, 2012 with a Patent Term Adjustment of 417 days, *id*. at 74–75. No office actions were issued and the examiner discussed only one piece of prior art, US 2008/0214173, which did not teach whether the subscription identifier matches a subscriber record and determining the unique subscriber record. *Id*. at 80.

VI. PERSON OF ORDINARY SKILL IN THE ART

A person of ordinary skill in the art ("POSITA") relating to the subject matter of the '827 patent is a person with a Bachelor of Science degree in electrical engineering or computer science or related field plus at least two to four years of professional experience in the field of relational databases. Ex. 1003, ¶ 35.

VII. CLAIM CONSTRUCTION

The construction process has begun in the litigation—the parties have exchanged proposed constructions (Ex. 1009) and begun briefing. A *Markman* hearing scheduled for December 15. Ex. 1011. The only term in contest between the parties regarding the '827 patent is "Subscriber Profile Repository SPR."[2] Petitioner has proposed that this term be construed according to the 3GPP standard: "a logical entity containing all subscriber/subscription related information needed for subscription-based policies and Policy and Charging Control rules as defined by the 3GPP standard." Patent Owner has proposed plain and ordinary meaning without more explanation. Further, as this term appears in the preamble, petitioner has proposed that the preamble be limiting, while Patent Owner has taken the opposite view.

[2] Petitioner has dropped all constructions but that of Subscriber Profile Repository SPR.

Petitioner believes its proposed construction provided in Exhibit 1009 is correct. In particular, petitioner's proposed construction of Subscriber Profile Repository (SPR) reflects the intrinsic record. Ex. 1001 at 1:49–51(citing 3GPP to explain an SPR). Similarly, this construction matches a POSITA's understanding of the technical term "Subscriber Profile Repository." But the competing constructions differ in ways that are not material to the invalidity analysis in this Petition. Petitioner has provided how the prior art discloses an SPR but the claims would be equally invalid under Patent Owner's construction that the preamble is not limiting. As explained below, Petitioner cites the 3GPP to provide a framework, including a subscriber profile repository, and thus provides a subscriber profile repository under Petitioner's narrower construction and under the plain and ordinary meaning, to the extent there is found to be a difference. Likewise, petitioner has demonstrated below that the preamble is disclosed in prior art. Thus, because the challenged claims are unpatentable under any of the proposed constructions, there is no need to construe any terms in the context of this IPR.

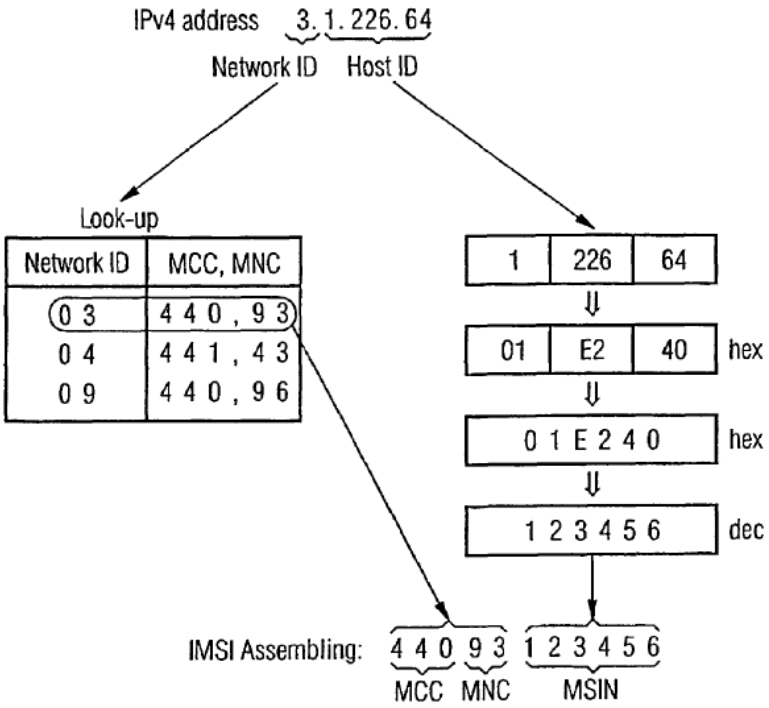
VIII. ASSERTED PRIOR ART

A. U.S. Patent No. 7,123,626 ("Feyerabend")

Feyerabend was filed in 2000 and issued in 2006, years before the earliest filing date of the '827 patent. Feyerabend discloses a method to facilitate the efficient transmission of data between communication systems with different

subscriber address types. *See* Ex. 1006 at 2:53–57. This method involves mapping an IP address of a data packet to an international mobile subscriber identity (IMSI) or other standard subscriber identifier, as illustrated below in Figure 6. *See id.* at 1:31–2:5, 3:57–5:20, 11:30–12:19, Fig. 6.

FIG. 6



As shown above, Feyerabend teaches a multi-step process to convert an IP address into an IMSI number. *See id*. at 3:57–5:55, 11:23–12:3, Fig. 6. First, a first portion of an IP address of the data packet being transmitted (i.e., the network identifier) is used to look up and retrieve a first portion of a subscriber's IMSI number. *See id.* at 11:25–55, Fig. 6 (looking up the MCC and MNC values of the

IMSI number using the network identifier). Next, a second portion the IP address (i.e., host identifier) is converted into a second portion of the subscriber's IMSI number by (i) converting each byte of the host identifier into its hexadecimal equivalent, (ii) concatenating the three hexadecimal numbers into a single hexadecimal number, and (iii) then converting the single hexadecimal number into its equivalent decimal number. *See id*. at 11:56–12:3, Fig. 6. Finally, the two portions of the IMSI number are concatenated to form the subscriber's IMSI number. *See id.* at Fig. 6.

Feyerabend discloses that "[i]n a further preferred embodiment of the present invention," the IMSI number or "subscriber identity is used in the cellular communications system to retrieve subscriber data from the subscriber profile database (HLR)." *Id.* at 5:45–51. For example, Feyerabend discloses that using a subscriber identity (e.g., IMSI number), "[a] gateway [can] request[] further subscriber data from a subscriber record database" to transmit data to a subscriber's mobile terminal. *Id.* at 7:49–58.

B. U.S. Patent No. 6,810,259 ("Zhang")

Zhang, filed on December 14, 2000 and issued on October 26, 2004, describes means for managing subscriber profile information in mobile communications networks. Zhang teaches managing subscriber profile information in a distributed

database system with a variety of base station caches. Zhang teaches using local cache databases to quickly obtain subscriber information and a central database for storing all subscriber information. Ex. 1007 at 8:40–9:20, Fig. 3A. These local cache databases store subscriber entries including various subscription identifiers such as a subscriber key value, a telephone number, and a manufacturer ID. *Id*. at 9:39–56.

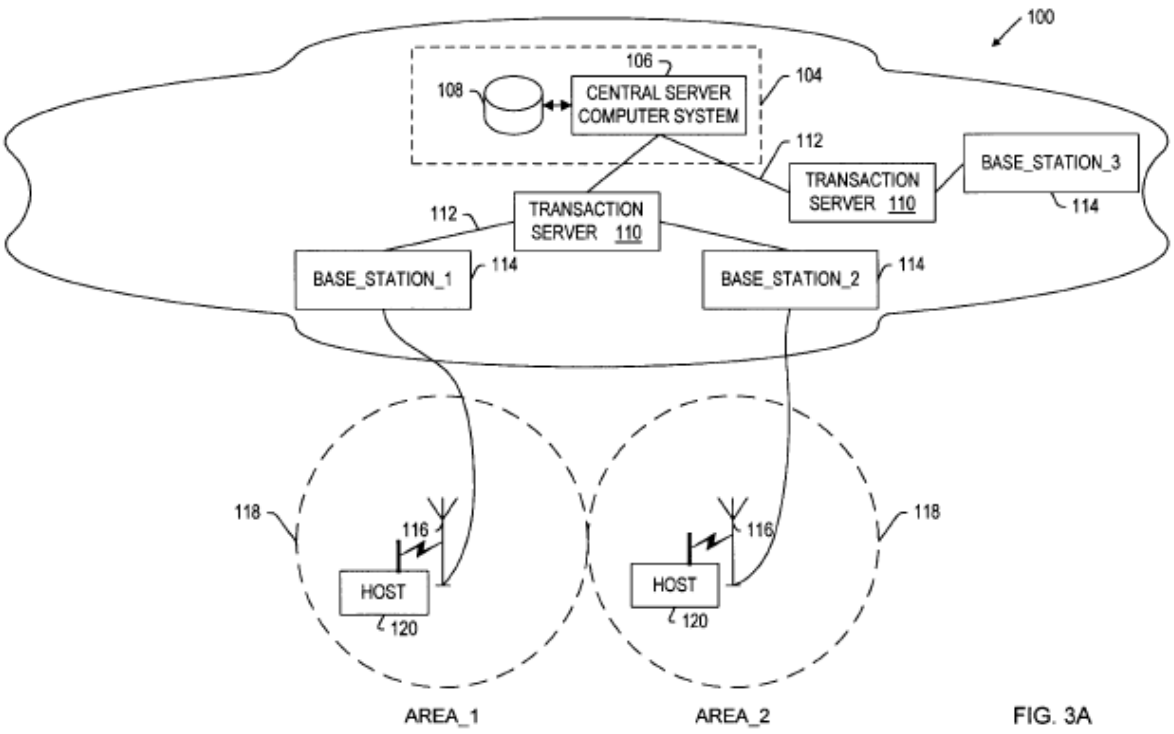


FIG. 3A

C. United States patent Application Publication US 2011/0125807 ("Bland")

Bland, filed on July 14, 2008 and published on May 26, 2011, similarly relates to managing subscriber information databases for communication devices. Bland

specifically targets a problem similar to that of the '827 patent—legacy provisioning with subscriber data. *Compare* Ex. 1008 at ¶ [0008] *with* Ex. 1001 at 1:12–28. Bland teaches using subscription identifiers, such as the IMSI, MSISDN, and IMS Public or Private User Identity, to search a subscriber database. *See* Ex. 1008 at ¶¶ [0071]–[0072], [0090]–[0091], Fig. 4. Bland further teaches handling errors arising from this process, such as failing to identify a subscriber and identifying multiple subscribers. *Id*. at ¶¶ [0070]–[0073].

D. 3GPP TS 29.212 version 8.3.0 ("3GPP TS 29.212")

3GPP TS 29.212 v 8.3.0, published on March 18, 2009, Ex. 1015, is a technical specification for "Policy and Charging Control over Gx reference point" located between the Policy and Charging Rules Function (PCRF) and the Policy and Charging Enforcement Function (PCEF) elements of a network. *See* Ex. 1005 at 10. The Policy and Charging Rules Function (PCRF) element of 3GPP is "a functional element that encompasses policy control decisions and flow based charging control functionalities." *Id*. at 12; *see* Ex. 1001 at 1:37–56. It "provides network control regarding the service data flow detection, gating, QoS and flow based charging (except credit management) towards the PCEF" by providing Policy and Charging Control ("PCC") rules to be enforced by the PCEF. *See* Ex. 1005 at 12. These policy control decisions rest in part on input from subscriber and service related data obtained from a "Subscription Profile Repository (SPR)." *See id*.

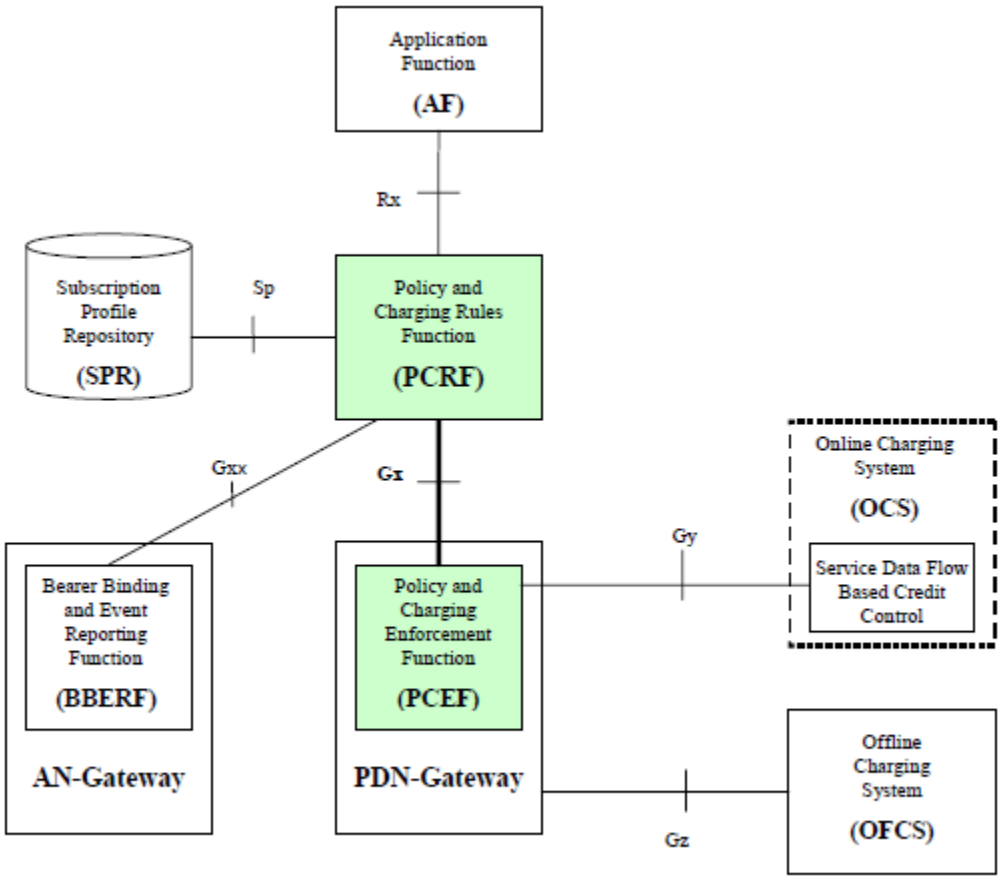


Figure 4.1: Gx reference point at the Policy and Charging Control (PCC) architecture

IX. INSTITUTING THIS IPR WOULD BE EQUITABLE

A. *NHK-Fintiv* Factors Support Institution

The Board balances six factors in considering denial under 35 U.S.C. §314(a). Here, the weight of these factors strongly favors institution. *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential) ("*Fintiv*").

1. Overlap Between Issues Raised in the Petition and in the Parallel Proceeding

There will be no overlap between this Proceeding and the Litigation, as Petitioner stipulates that, if this IPR proceeding is instituted, Petitioner will not

pursue in the Litigation the grounds raised here, or that could have reasonably been raised (i.e., any ground that could be raised under §§ 102 or 103 on the basis of prior art patents or printed publications). This wavier is intended to be commensurate in scope with the estoppel provisions of 35 U.S.C. § 315(e)(2).

The PTAB has found this kind of stipulation to "mitigate[] any concerns of duplicative efforts between the district court and the Board, as well as concerns of potentially conflicting decisions." *Sotera v. Masimo Wireless*, IPR2020-01019, Paper 12 at 19 (PTAB Dec. 1, 2020) (Precedential as to § II.A). As such "this factor weighs strongly in favor of not exercising discretion to deny institution." *Id*.; *accord Sand Revolution II, LLC v. Cont'l Intermodal Group – Trucking LLC*, IPR2019-01393, Paper 24 at 12 FN 5 (PTAB June 16, 2020) (informative).

Moreover, and in addition to this waiver, there are additional issues addressed in this Petition that are not addressed in the Litigation. This Petition challenges ten more claims than at issue in the Litigation. This Petition challenges claims 1–8, 14–21 whereas only claims 1, 6, 7, 14, 19, and 20 are at issue in the Litigation. This is more than double the claims at issue in the District Court and as such there is significant difference in the issues raised in the Petition and in the parallel proceeding. For example, any discussion of buffers or local caches as found in Feyerabend and Zhang would not be relevant in district court as claims 2–5 and 15–18 are not at issue in the district court. Similarly, Zhang, as used in Ground 2, would

be largely not relevant to the district court action and represents entirely different art.

2. Likelihood of a Stay

Neither party has requested a stay in the parallel Litigation. Typically, a district court stay of the litigation pending resolution of the PTAB trial allays concerns about inefficiency and duplication of efforts. However, here those concerns are alleviated by the above stipulation, which confirms that the PTAB—and the PTAB alone—will address invalidity under §§ 102 and 103 based on patents and printed publications. This ensures that IPR is a "true alternative" to the district court proceeding. *Sand Revolution*, IPR2019-01393, Paper 24 at 7.

This factor thus weighs in favor of institution or is at least neutral.

3. Proximity of the Court's Trial Date to a FWD

The parties submitted a Joint Motion To Enter Scheduling Order on July 29, 2021 with proposed schedules (Exhibit 1010[3]). In response to this Joint Motion, the District Court ordered that the ten patent disputes filed by Brazos Licensing and Development be split up into three groups with the first group being scheduled for

[3] Petitioner has provided Patent Owner's proposed schedule which the court most closely followed. *See* Ex. 1011 (pushing pre-*Markman* dates by one week while holding other dates constant).

trial on December 5, 2022. Ex. 1011. The trial date for the other two groups has not yet been set. The parties have not yet determined which group the '827 Patent will be a part of nor the trial date for the '827 Patent. However, there is a significant likelihood that trial on this patent will occur later in 2023.

Petitioner notes, however, that even in cases where trial is earlier than an expected final written decision, the Board should seek "to balance considerations such as system efficiency, fairness, and patent quality." *Fintiv,* IPR2020-00019, Paper 11 at 5 (collecting cases). Here, that balance weighs in favor of institution, as, even if trial occurs before a final written decision, Petitioner has filed a broad *Fintiv* waiver that ensures this forum will be the only one to consider patentability based on 102/103 printed publications.

4. Investment in the Parallel Proceeding

Investment in the parallel proceeding has been minimal. WSOU did not serve the complaint until February 24, 2021. Ex. 1012, Ex. 1013.

At this point, the district court has invested virtually no time in assessing the parties' claims and defenses—including invalidity. No motion for preliminary injunction was filed. Other than a motion to dismiss the complaint, that the court has issued no order nor scheduled a hearing for, no substantive motions have been brought before the district court. The district court will have invested little time in

addressing the invalidity of the '827 patent by the time this Board decides whether to institute this Petition.

While the district court will invest some time in deciding the parties claim construction disputes by the Markman hearing on December 15, it will likely not invest significantly in deciding invalidity until dispositive motions are filed in September 2022. Ex. 1010, Ex. 1011. As such the Court is not expected to invest time in determining invalidity until months after an institution decision on this petition.

Given these circumstances, this factor favors institution.

5. Whether the Petitioner and the Defendant in the Parallel Proceeding are the Same Party

The parties are the same in this IPR and in the Litigation. Given the stipulation discussed above, however, this factor is neutral.

6. Other Circumstances, that Impact the Board's Exercise of Discretion, Including the Merits

Other circumstances strongly favor institution. In particular, denying institution here will (1) negate the statutorily provided 1-year filing period—because this Petition was filed before closure of the 1-year window; (2) encourage forum shopping; and (3) condition the institution of IPRs on the timing of an oft-changed trial placeholder. No other parties have sought IPR of the '827 patent.

In particular, Congress, when enacting the America Invents Act, explained that district court defendants should be permitted more than 6 months to fully evaluate claims in a parallel litigation—extending the IPR bar date from 6 months to 1 year. *See* 157 Cong. Rec. S5429 (Sept. 8, 2011) (S. Kyl) (explaining importance of allowing an accused infringer to seek IPR in view of estoppel, and concomitant need to extend deadline from six months to 12 months to afford defendants a reasonable opportunity to identify and understand patent claims before filing an IPR that may trigger estoppel).

Moreover, the merits of the present Petition are particularly strong and outweigh countervailing considerations of efficiency. Had the Examiner been aware of these references during prosecution, the Examiner would not have issued the '827 patent. As detailed above, the combinations based on 3GPP and Feyerabend provide compelling disclosures that render obvious all challenged claims of the '827 patent. These considerations weigh in favor of institution. *Illumina, Inc. v. Natera, Inc*, IPR2019-01201, Paper 19 at 8 (PTAB Dec. 18, 2019) (instituting when "the strength of the merits outweighs relatively weaker countervailing considerations of efficiency").

B. 35 U.S.C. § 325(d) Factors Support Institution

Similarly, the Board should not exercise its discretion under § 325(d). Neither of the two prongs to analyze denial under 325(d) are relevant here. *Advanced*

Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH, Paper 6 at 7 (PTAB Feb. 13, 2020).

1. None of the Cited Prior Art Was Cited During Prosecution

First, with the exception of 3GPP, none of references discussed in Grounds 1, 2, and 3 have been considered by the Patent Office in prosecution. They were not considered by the Examiner, cited in an IDS, nor were they cited on the face of the '827 patent. Moreover, there are no IPR or post-grant proceedings involving the '827 patent to date. *See generally* Ex. 1001, Ex. 1002.

Likewise, 3GPP, was also not cited in an IDS or cited on the face of the '827 patent. It was, however, discussed in the '827 specification to explain the starting framework upon which the '827 patent builds. *See* Ex. 1001. This petition uses the 3GPP reference for this same framework and explains how the additional references cited below disclose the same invention claimed by the '827 Patent.

2. The Cited Prior Art Is Not Cumulative of Cited Art

Second, the art cited in this petition is not cumulative of the art substantively considered by the Examiner. Namely, because the Examiner did not substantively appear to consider any art. *See generally* Ex. 1002 (issuing no rejections).

Discretionary denial under § 325(d) is thus unwarranted. *Pure Storage, Inc. v. Realtime Data LLC*, IPR2018-00549, paper 7 at 11 (PTAB July 23, 2018).

X. GROUND 1: FEYERABEND AND 3GPP RENDER CLAIMS 1–4, 6, 8, 14–17, 19, AND 21 OBVIOUS.

This ground relies on the standardized framework recognized across the mobile networking industry, the 3GPP. *See* Ex. 1003 at ¶¶ 39-42. This ground proposes that a POSITA would have found it obvious to modify the 3GPP's subscription profile repository according to the teachings of Feyerabend, specifically, to determine a unique subscriber profile record. 3GPP discloses a SPR and the framework to support the use of a SPR and leaves many of the details for the operation of a SPR to the user. Such detailed inner workings are disclosed in Feyerabend, in particular a means of identifying subscribers using an IP address and the use of a buffer to reduce search times. A POSITA would have been motivated to apply the teachings of Feyerabend to the 3GPP framework because it would have been "efficient and cost-effective" to leverage an IP based data session "to allow an efficient data transmission by use of co-existing different subscriber address types" already in use in the 3GPP. Ex. 1006 at 2:55–60; Ex. 1003 at ¶¶ 49–57.

The 3GPP is a standard specification in the industry. A POSITA would therefore have found it obvious to use the disclosed SPR as a basis for any subscriber profile management functionality. Ex. 1003 at ¶ 49. Likewise, the 3GPP is intended as a common and uniform framework in the mobile networking field. It would therefore have been the obvious and most efficient starting point for a POSITA to

implement the teachings of Feyerabend. *Id*. at ¶ 50. Applying Feyerabend's method of identifying subscribers to 3GPP's SPR would increase efficiency by taking advantage of the already implemented IP addresses used in 3GPP to identify subscribers. *Id*. at ¶¶ 51–52.

This combination would have been easy to implement as Feyerabend describes a very similar system to the 3GPP. *Id*. at ¶ 53. Feyerabend explains its system may be implemented with a subscriber profile database and look-up modules. Ex. 1006 at 3:26–27. This is the same as the SPR disclosed in 3GPP is a subscriber database with a variety of functional look-up nodes, a POSITA would have found it obvious, and easy, to apply the teachings of Feyerabend to a 3GPP SPR. Ex. 1003 at ¶ 53. Moreover, both the 3GPP and Feyerabend utilize IP transmission in mobile networks. *See* Ex. 1006 at 2:58–64; Ex. 1005 at § 3. A POSITA would have found it straightforward to apply the search techniques of Feyerabend to the framework of 3GPP as they disclose a similar software framework and us similar hardware. Ex. 1003 at ¶ 53.

In addition to these reasons, a POSITA would have naturally applied the teachings of Feyerabend to the framework of 3GPP for the following reasons:

Same field of endeavor: Like the '827 patent, both 3GPP and Feyerabend are directed to solving problems associated with using IP networking in a mobile network space. 3GPP explains the PCC Rules, managed by the SPR, relate to

"downlink IP Can bearers" and "uplink IP flows" which 3GPP defines as relating to "IP transmission path[s]" and "IP packets with the same source IP address." Ex. 1005 at 9, 11. Feyerabend focuses on the same "IP based data session" as described in the 3GPP. *See, e.g.*, Ex. 1006 at 2:58–64. A POSITA would understand that 3GPP provides a framework for IP networking generally and would thus benefit from the advanced techniques of Feyerabend to take full advantage of utilizing IP networking. Ex. 1003 at ¶ 55.

Similar techniques to solve the same problems: Again, like the '827 patent, both 3GPP and Feyerabend are directed to using IP networking to solve the problem of managing legacy subscriber information. *See* Ex. 1006 at 2:58–64, Ex. 1005 at § 3. 3GPP aims to solve the problem of an ever increasing demand for data in telecommunications networks built on voice only communication hardware by implementing an IP channel. Ex. 1001 at 1:12–36. Feyerabend similarly recognizes this issue and likewise advises the use of IP networking. Ex. 1006 at 1:40–48. A POSITA, presented with the problem of identifying subscribers and associated subscription profiles, would have naturally looked to combine 3GPP and Feyerabend for a solution. Ex. 1003 at ¶ 56.

Reasonable expectation of success: A POSITA would further have had a reasonable expectation of success in applying the search technique of Feyerabend to the framework of 3GPP. Due to the similarity of SPR of 3GPP and the subscriber

profile database and address conversion node of Feyerabend, a POSITA would have little difficulty in applying Feyerabend's search technique to 3GPP. Ex. 1003 at ¶ 57. Similarly, 3GPP was intentionally designed to provide a framework for a variety of applications in the field of IP mobile networking.

A. Claim 1

1. 1.P (Preamble): Disclosure in the Prior Art

"A method performed by a Subscriber Profile Repository (SPR) for determining a unique subscriber record from a set of subscription identifiers, the method comprising:"

3GPP TS 29.212 discloses the very same "Subscriber Profile Repository (SPR)" required by the preamble. The disclosed 3GPP's SPR provides information regarding "subscriber and service related data." Ex. 1005 at 14, Fig. 4.1; *see* Ex. 1003 at ¶ 59. Indeed, the '827 patent is specific that the claimed SPR is based on the SPR identified in 3GPP, using the same terminology, same abbreviation, discussing the same components, and using near identical figures. Ex. 1001 at 3:44–54 ("[T]he EPC may be implemented, at least in part, according to the 3GPP . . . EPC 130 may include . . . a subscription profile repository (SPR)."); *see also* Ex. 1001 at 1:29–36, 1:49–51, 4:43–44, Fig 1. Petitioner's expert Dr. Schmidt has provided the below annotated comparison of '827 Fig. 1 and 3GPP Fig. 4.1. Ex. 1003 at ¶ 59.

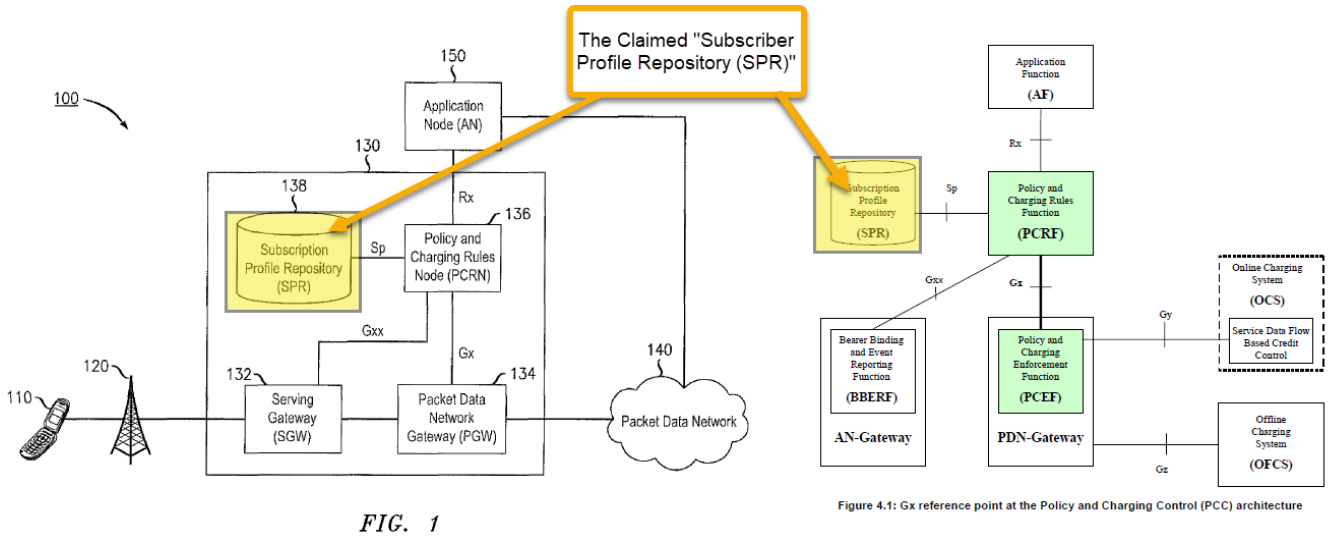


FIG. 1

Feyerabend provides the functional components of a Subscriber Profile Repository by teaching the use of a "subscriber profile database" in conjunction with an "address conversion node" to identify subscribers. Feyerabend provides "a subscriber profile database that comprises subscriber profile data." Ex. 1006 at 3:26–27.

Further, Feyerabend describes a means of determining a subscription profile, a unique subscriber record, with a subscriber identity from a subscriber's IP address, a set of subscription identifiers. Feyerabend uses the IP address to identify subscribers by mapping the subcomponents of the IP address to various industry standard subscription identifiers, creating a Mapped IP Address. *See id*. at 11:23–12:19. As such the Mapped IP Address acts as the claimed "set of subscription identifiers." In particular, the "division [of] the IP address in network identifier and host identifier is used for the mapping of the first and second portion of the

subscriber identity." *Id*. at 11:37–39. Feyerabend specifically discloses that the network identifier and host identifier of an IP address can be mapped to an international mobile station identity (IMSI). *Id*. at 10:60–11:3. An IMSI has three distinct parts: a mobile country code (MCC), a mobile network code (MNC), and a mobile station identification number (MSIN). *Id*. The network identifier of an IP address maps to an MCC and MNC, identifying the country and home public land mobile network of a mobile station, and the host identifier maps to an MSIN uniquely identifying a mobile station within a public land mobile network. *Id.* at 11:44–55.

In this way each of the IP address, the Network ID, Host ID, MCC, MNC, MSIN, and IMSI can act as a subscription identifier. Ex. 1003 at ¶ 62. For example, the MCC potentially identifies the subscribers associated with a provider in a certain country. Ex. 1006 at 10:60–11:3. As such a POSITA would recognize this Mapped IP Address acts as a set subscription identifier and a single subscription identifier itself. Ex. 1003 at ¶ 62.

Feyerabend also provides "an address conversion node for the determination of the subscriber identity (SI) from a given IP address" or the claimed "determining a unique subscriber record from a set of subscription identifiers." Ex. 1006 at 4:3–5. This limitation is described in further detail below in Limitations 1.2 and 1.3.

2. Limitation 1.1

"receiving a message including at least one subscription identifier;"

Feyerabend discloses receiving a data packet including a subscriber's IP address. This received subscriber IP address is the claimed "at least one subscription identifier," and acts as pieces of information that identify a subscriber.

Specifically, during Feyerabend's first step, a message is received in the form of a data packet. Ex. 1006 at 8:28–32. This data packet is the claimed "message." This data packet ("message") includes the IP address[4] ("at least one subscription identifier") of a subscriber and acts to identify a subscriber. Specifically, Feyerabend discloses "a first step 305, a data packet [the claimed message] is sent from a host or an applications server 110 to a gateway 130. The gateway tracks in the next step 310 whether a subscriber identity SI that belongs to the IP address [the claimed subscription identifier] is stored in a local buffer 301 of the gateway." *Id.* at 8:28–32. At step 320, "the gateway requests 320 by use of the IP address [the claimed subscriber identifier] the subscriber identity SI from the address conversion node 140." *Id.* at 8:35–36.

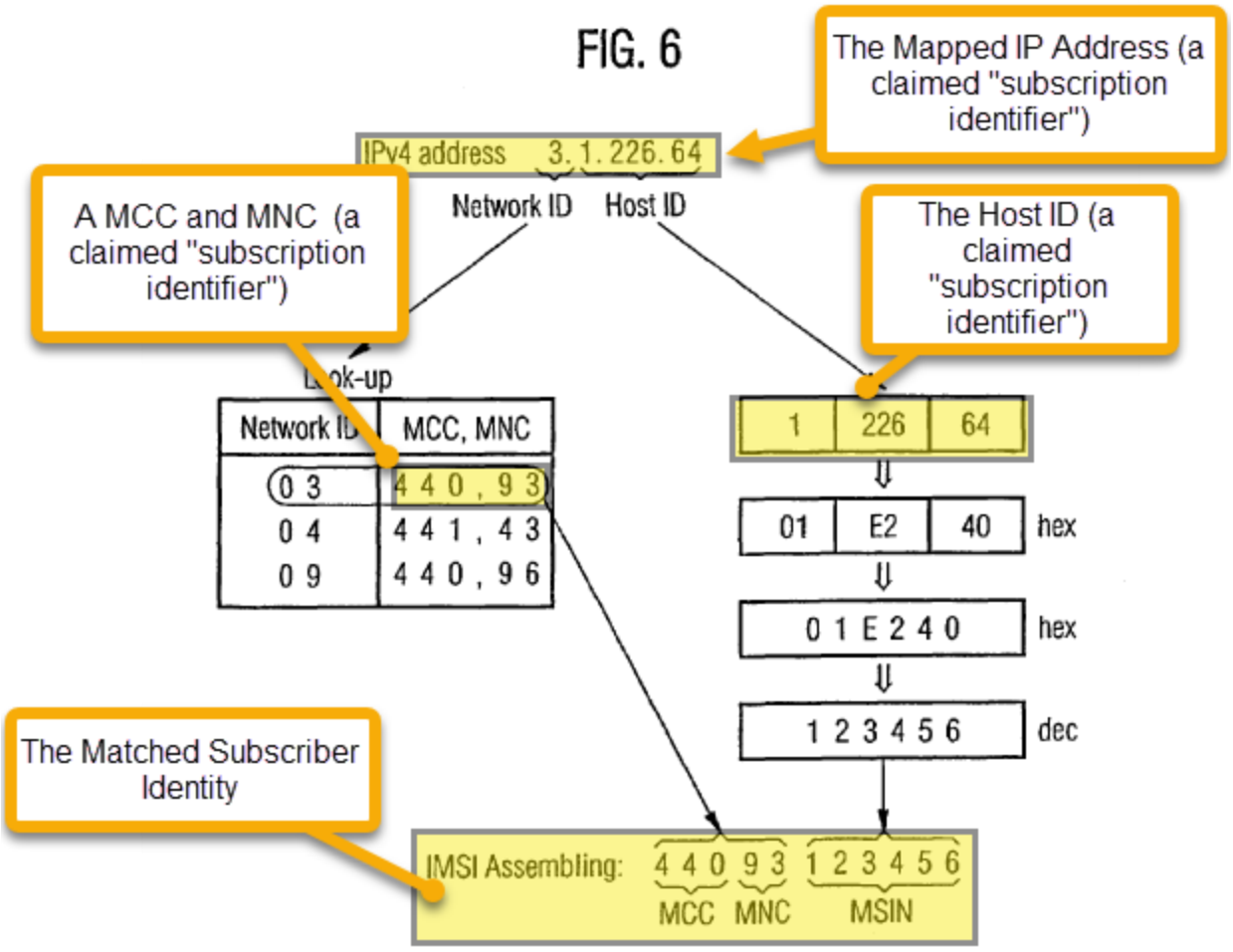
[4] As explained in *supra* 1.P, Feyerabend discloses using the Mapped IP Address as a set of subscription identifiers.

3. Limitation 1.2

"***for each subscription identifier of the at least one subscription identifier; determining whether the subscription identifier matches a subscriber record;"***

Feyerabend discloses using an address look up table to determine that the Mapped IP Address ("subscription identifier") matches a subscriber record. Ex. 1006 at 3:24–26. In particular, because Feyerabend teaches that the Subscriber Identity identifies the subscriber and is the only data needed to retrieve subscriber information from the record database, determining the Subscriber Identity determines that the subscription identifiers match a subscriber record. Ex. 1003 at ¶ 66.

Feyerabend teaches "the subscriber identity is determined by a lookup of a first portion of the IP address [i.e., the Network ID] in a lookup table, resulting in a first portion of the subscriber identity." *Id*. at 3:57–59. Next, "[a] second portion of the subscriber identity is assigned according to a second portion of the IP address [i.e., Host ID]." *Id.* at 3:59–61, 11:56–12:3. With both portions of the subscriber identity determined in this manner, the Mapped IP Address has been matched to a subscriber record. *Id*. 8:43–50. Petitioner's expert Dr. Schmidt has annotated figure 6 of the '827 patent to highlight how each of the subscription identifiers, as explained *supra* Limitation 1.1, is matched to the Subscriber Identity. Ex. 1003 at ¶ 67.



Because the Subscriber Identity "identifies the subscriber to the communications system for its internal business," determining that an IP Address matches a subscriber identity means that the IP Address, and the subcomponents thereof, such as the MCC and MNC as identified above, matches a subscriber record. *See id*. at 2:66–3:1; Ex. 1003 at ¶ 68. Likewise, Feyerabend explains only this Subscriber Identity is needed to retrieve subscriber information from the subscriber record database. *See id.* at 8:43–50. As such, Feyerabend teaches, for each

subscription identifier, determining whether the subscription identifier matches a subscriber record for each subscription identifier. Ex. 1003 at ¶ 68.

4. Limitation 1.3

"***for each subscription identifier of the at least one subscription identifier; [] and determining that the subscriber record is the unique subscriber record when each subscription identifier that matches the subscriber record matches an identical subscriber record.***"

While perhaps poorly worded, the specification describes this step as determining the subscriber record identified in Limitation 1.2 is the unique subscriber record when all of the subscription identifiers match the same subscriber record.

Feyerabend determines a subscriber record is unique, i.e., the only record matching the subscription identifiers, when "each subscription identifier that matches the subscriber record," identified in Limitation 1.2, matches an identical subscriber record, i.e., all subscription identifiers match the same subscriber record.

Feyerabend discloses that its system can "easily implement a bijective rule [i.e., a one-to-one correspondence] for the determination of a subscriber identity from a given IP address," thereby ensuring each Subscriber Identity (i.e., IMSI) is unique to each IP Address. *Id*. at 4:2–4. Further, Feyerabend teaches that the Subscriber Identity is the only value necessary to "access . . . a subscriber profile

and . . . locat[e] a subscriber." *Id.* at 1:64–66. In this way, the Subscriber Identity uniquely identifies a subscriber record within a subscriber profile database. This is further supported by Feyerabend's choice of exemplar Subscriber Identity: "[t]he IMSI is a mobile station identifier ***uniquely*** identifying a mobile station internationally." *Id.* at 4:17–18 (emphasis added); Ex. 1003 at ¶ 70.

As such Feyerabend's look up process meets this limitation. When assembling a Subscriber Identity, the address lookup table matches each subscription identifier, e.g., the IP Address, MCC, MNC, and MSIN, to the same, identical, Subscriber Identifier. Ex. 1003 at ¶ 71. First, "a first portion of the IP address [is searched] in a look up table, resulting in a first portion of the subscriber identity." Ex. 1006 at 3:58–61. Second, "[a] second portion of the subscriber identity is assigned according to a second portion of the IP address." *Id.* The resulting MCC/MNC and MSIN are then assembled into an IMSI, the subscriber identity. *Id.* at 11:56–12:3. As such, Feyerabend discloses determining that each of the subscription identifiers matches the same, identical, subscriber identity. In this instance, because the combination of both subscription identifiers maps to a single Subscriber Identity [i.e., IMSI], they also map to an identical subscriber record. *Id.* at 4:15–23; Ex. 1003 at ¶ 71. As such the look up process determines any subscriber record identified in Feyerabend is unique. Ex. 1003 at ¶ 71.

B. Claim 2: "The method of claim 1, wherein the step of determining whether the subscription identifier matches the subscriber record further comprises:

1. Limitation 2.1

"querying a subscriber record cache for the subscription identifier;"

Feyerabend discloses querying a subscriber record cache, here termed a local buffer, storing various subscriber record information, for the Mapped IP Address, subscription identifier. Feyerabend discloses that "[t]he gateway tracks in the next step 310 whether a subscriber identity SI that belongs to the IP address is stored in a local buffer 301 of the gateway." *Id*. at 8:30–32. A POSITA would understand that the gateway "tracks" whether a subscriber identity is stored in the buffer by searching or querying the buffer. Ex. 1003 at ¶ 72.

2. Limitation 2.2

"if the subscription identifier matches the subscriber record in the subscriber record cache, adding the matching subscriber record to a list of subscriber records; and;"

Feyerabend discloses: "[A]fter receiving of such a further data packet sent 360 from the host or application server 110 to the gateway 130, the gateway sends 365 the IP address to the buffer, and receives 370 the corresponding subscriber identity SI. With this subscriber identity, further steps necessary for the delivery of at least the data packet's payload information are performed. I.e., in step 375 the gateway

130 sends the subscriber identity SI to the subscriber record data base 150 and retrieves 380 subscriber data." Ex. 1006 at 8:67–9:8. As such when a match is found in the buffer, the IP address or subscription identifier is then sent to the subscribe record database 150, in effect a list of unfound subscription identifiers. Ex. 1003 at ¶ 74.

3. Limitation 2.3

"if the subscription identifier does not match the subscriber record in the subscriber record cache, maintaining the subscription identifier in a list of unfound subscription identifiers."

Feyerabend discloses that "[i]f the subscriber identity is not available at the local buffer a negative acknowledgement is sent back 315 to the gateway. Then, the gateway requests 320 by use of the IP address the subscriber identity SI from the address conversion node 140." Ex. 1006 at 8:33–37. As such when there is no match found in the buffer, the IP address or subscription identifier is then sent to the address conversion node 140, in effect a list of unfound subscription identifiers. Ex. 1003 at ¶ 74.

C. Claim 3 "The method of claim 2, wherein the at least one subscription identifier matches the subscriber record in the subscriber record cache, and the step of determining whether the subscription identifier matches the subscriber record further comprises:"

1. Limitation 3.1

"for each subscription identifier in the list of unfound subscription identifiers, querying a subscriber record database;"

As described above, the list of unfound subscription identifiers from Limitation 2.3 are used to query a subscriber record database as described in Limitation 1.2 and 1.3. Feyerabend discloses that "[i]f the subscriber identity is not available at the local buffer . . . [t]hen, the gateway requests 320 by use of the IP address the subscriber identity SI from the address conversion node 140." Ex. 1006 at 8:33–37. As such for each identifier in a list of unfound subscription identifiers, *see* Limitation 2.3 *supra*, the system queries a subscriber record database. Ex. 1003 at ¶ 75.

2. Limitation 3.2

"for each subscription identifier in the list of unfound subscription identifiers, . . . if the subscription identifier matches the subscriber record in the subscriber record database, adding the matching subscriber record to the subscriber record cache; and"

Once the steps of Limitations 1.2 and 1.3 are completed, Feyerabend teaches adding the identified Subscriber Identity, subscriber record, to the local buffer, subscriber record cache. Feyerabend discloses that "[a]fter receiving 325 of the subscriber identity SI from the address conversion node, the gateway sends 328 the IP address and a corresponding subscriber identity SI to the local buffer. This allows later on if further data packets for the same receiver are received during the data session an easy look-up of the subscriber identity." Ex. 1006 at 8:37–42.

3. Limitation 3.3

"for each subscription identifier in the list of unfound subscription identifiers, . . . returning an error message."

Feyerabend also discloses when the IP Address, subscription identifier, is not found in the local buffer, and as such the subscription identifier is added to the list of unfound subscription identifiers, "a negative acknowledgement[, i.e., an error message,] is sent back 315 to the gateway." *Id*. at 8:34. Such error messages are well known technique of programming, taught to computer science majors for decades and thus any POSITA would understand to implement one in this situation. Ex. 1003 at ¶ 77.

D. Claim 4 "The method of claim 2, wherein the subscriber record cache does not include the subscriber record matching any subscription identifier, the method further comprising:"

1. Limitation 4.1

"for each subscription identifier: querying a subscriber record database, and"

See Limitations 1.2 and 1.3 *supra*.

2. Limitation 4.2

"for each subscription identifier: . . . if the subscriber record database contains the subscriber record matching the subscription identifier, adding the matching record to the subscriber record cache."

See Limitation 3.2 *supra*.

E. Claim 6 "The method of claim 1, further comprising:"

"returning an error message when the subscription identifiers do not match any subscriber record."

Feyerabend also discloses that when a subscription identity is not found in the local buffer, and as such the subscription identifier is added to the list of unfound subscription identifiers, "a negative acknowledgement[, i.e., an error message,] is sent back 315 to the gateway." *Id*. at 8:34. In this way an error message is returned. Ex. 1003 at ¶ 80; *see* Limitation 3.3. Further, to the extent that the patent owner argues Feyerabend does not disclose "returning an error message when the

subscription identifiers do not match any subscriber record," it would have been obvious to apply the "negative acknowledgement" disclosed with regard to the local buffer to searching the address conversion node. Ex. 1003 at ¶ 80.

F. Claim 8 "The method of claim 1, wherein the set of subscription identifiers comprises at least one of: an International Mobile Subscriber Identification (IMSI); a Mobile Station International Subscriber Directory Number (MSISDN); a Session Initiation Protocol Uniform Resource Indicator (SIP URI); and a Network Access Identifier (NAI)."

As described above with regard to Limitations 1.1 and 1.2, Feyerabend teaches using an IP address mapped to an IMSI to identify a subscriber. Feyerabend discloses using "an IMSI from a given IPv4 address in a Class A format" to determine a subscriber identity. Ex. 1006 at 11:23–24; *see* Limitation 1.2 *supra*. In this way the set of subscription identifiers comprises, in part, an IMSI. Ex. 1003 at ¶ 81.

G. Claim 14 "A non-transitory machine-readable storage medium encoded with instructions for a Subscriber Profile Repository (SPR) to determine a unique subscriber record from a set of subscription identifiers, the machine-readable medium comprising:"

See Claim 1 *supra*. Feyerabend further discloses that "[t]he invention is preferably realized by a computer program that is loadable into the internal memory of a digital computer." Ex. 1006 at 3:46–48. A POSITA would understand the internal memory to preferably implemented as non-transitory memory. Ex. 1003 at ¶ 82. Non-transitory memory is the preferred format storing such computer

programs. *Id.* Such a computer program "comprises software code portions that are adapted to perform the steps of the method" or provides instruction for each process. Ex. 1006 at 3:51–52; Ex. 1003 at ¶ 82. As such a POSITA would have found it obvious to use "non-transitory machine-readable storage medium encoded with instructions." *Id.*

1. Limitation 14.1

"instructions for receiving a message containing at least one subscription identifier;"

See Limitation 1.1 *supra*. Feyerabend further provides for machine-readable instruction. *See* Claim 14 *supra*.

2. Limitation 14.2

"instructions for determining, for each subscription identifier of the at least one subscription identifier, whether the subscription identifier matches a subscriber record; and "

See Limitation 1.2 *supra*. Feyerabend further provides for machine-readable instruction. *See* Claim 14 *supra*.

3. Limitation 14.3

"instructions for determining that the subscriber record is the unique subscriber record when each subscription identifier that matches the subscriber record matches an identical subscriber record."

See Limitation 1.3 *supra*. Feyerabend further provides for machine-readable instruction. *See* Claim 14 *supra*.

H. Claim 15 "The non-transitory machine-readable storage medium of claim 14, wherein the instructions for determining whether the subscription identifier matches the subscriber record further comprise:"

1. Limitation 15.1

"instructions for querying a subscriber record cache for the subscription identifier;"

See Limitation 2.1 *supra*. Feyerabend further provides for machine-readable instruction. See Claim 14 *supra*.

2. Limitation 15.2

"instructions for adding the matching subscriber record to a list of subscriber records if the subscription identifier matches the subscriber record in the subscriber record cache; and"

See Limitation 2.2 *supra*. Feyerabend further provides for machine-readable instruction. See Claim 14 *supra*.

3. Limitation 15.3

"instructions for adding the subscription identifier to a list of unfound subscription identifiers if the subscription identifier does not match the subscriber record in the subscriber record cache."

See Limitation 2.3 *supra*. Feyerabend further provides for machine-readable instruction. *See* Claim 14 *supra*.

I. Claim 16 "The non-transitory machine-readable storage medium of claim 15, wherein at least one subscription identifier matches the subscriber record in the subscriber record cache, and the instructions for determining whether the subscription identifier matches the subscriber record further comprise:"

1. Limitation 16.1

"instructions for querying a subscriber record database for each subscription identifier in the list of unfound subscription identifiers to determine whether the subscription identifier matches the subscriber record in the subscriber database; and"

See Limitation 3.1 *supra*. Feyerabend further provides for machine-readable instruction. *See* Claim 14 *supra*.

2. Limitation 16.2

"instructions for adding the matching subscriber record to the subscriber record cache and returning an error message if the subscription identifier matches the subscriber record in the subscriber record database."

See Limitations 3.2, 3.3 *supra*. Feyerabend further provides for machine-readable instruction. *See* Claim 14 *supra*.

J. Claim 18 "The non-transitory machine-readable storage medium of claim 15, wherein the subscriber record cache contains no subscriber records matching any subscription identifier, the machine-readable storage medium further comprising:"

1. Limitation 18.1

"instructions for querying a subscriber record database for each subscription identifier; and"

See Limitation 4.1 *supra*. Feyerabend further provides for machine-readable instruction. *See* Claim 14 *supra*.

2. Limitation 18.2

"instructions for adding a matching record to the subscriber record cache if the subscriber record database contains the subscriber record matching the subscription identifier."

See Limitation 4.2 *supra*. Feyerabend further provides for machine-readable instruction. *See* Claim 14 *supra*.

K. Claim 19 "The non-transitory machine-readable storage medium of claim 14, further comprising:"

"***instructions for returning an error message when the subscription identifiers do not match any subscriber record."***

See Claim 6 *supra*. Feyerabend further provides for machine-readable instruction. *See* Claim 14 *supra*.

L. Claim 21 "The non-transitory machine-readable storage medium of claim 14, wherein the set of subscriber identifiers comprises at least one of: an International Mobile Subscriber Identification (IMSI); a Mobile Station International Subscriber Directory Number (MSISDN); a Session Initiation Protocol Uniform Resource Indicator (SIP URI); and a Network Access Identifier (NAI)."

See Claim 8 *supra*. Feyerabend further provides for machine-readable instruction. *See* Claim 14 *supra*.

XI. GROUND 2: FEYERABEND, 3GPP, AND ZHANG RENDER CLAIMS 2–5 AND 15–18 OBVIOUS

Petitioner provides an alternative ground as to claims 2–4 and 15–17. This ground adds Zhang as it relates to the use of a local cache and associated database mechanisms. This ground also presents a separate ground regarding claims 5 and 18 for clearing the local cache. To the extent Patent Owner argues Feyerabend does not provide a fulsome explanation of the use of a local cache or buffer, Zhang focuses its disclosure on the use of a local cache to provide a faster and more responsive distributed database. As such a POSITA would have been motivated to apply the caching techniques of Zhang to the searching mechanism taught by Feyerabend as applied to the framework of 3GPP.

A. Motivation to Combine

A POSITA would have been motivated to add the local caching disclosed by Zhang to the combination of 3GPP and Feyerabend to decrease the delivery time of data of the "subscriber identity and/or the further address information." Ex. 1006 at

4:48–49. Zhang provides a detailed disclosure of a local caching system which can be advantageously implemented into the buffer as described by Feyerabend. This decreased delivery time would motivate a POSITA to add the cache taught in Zhang to the search mechanism taught by Feyerabend.

A POSITA would have found it further obvious to combine the teaching of Zhang to the Feyerabend-3GPP combination explained above. Each of the three references address the same field of endeavor, use similar techniques to solve the same problem, and provide a reasonable expectation of success.

In particular, it would have been obvious to implement the database operations of Feyerabend on the standardized framework of the 3GPP using the local caching techniques of Zhang. Because 3GPP is a standard specification, a POSITA would have readily used it as a starting point for most any endeavor in the field of mobile networking, such as that disclosed by Feyerabend and Zhang. Indeed, the '827 patent itself acknowledges 3GPP as a starting point for its disclosure. *See* Ex. 1001 at 1:28–56; Ex. 1003 at ¶ 98. As explained above, Feyerabend particularly describes utilizing the IP address of mobile subscribers in the manner enabled by the 3GPP. Zhang similarly describes "plans to implement fully Internet protocol (IP)" in a mobile network. Ex. 1007 at 4:35–37.

As explained in Feyerabend "the deliver time of data is decreased" by using a local buffer/cache. Ex. 1006 at 4:46–50. As such a POSITA would have been

motivated to combine the more robust caching system described below to the database management system described in Feyerabend as implemented on the framework of the 3GPP. Ex. 1003 at ¶ 99.

Same field of endeavor*:* Feyerabend and Zhang are both directed to solving problems associated with managing subscriber information using subscription identifiers in a mobile network. Both Feyerabend and Zhang describe improvements to these systems in light of the application of Internet Protocol to mobile communications networks. Ex. 1006 at 1:60–2:5; Ex. 1007 at 4:34–44, 7:45–61. Ex. 1003 at ¶ 100. The same is true of the 3GPP. *Supra* Claim 1.

Similar techniques to solve the same problems*:* Feyerabend and Zhang both describe applying Internet Protocol to mobile communication networks. Ex. 1006 at 1:60–2:5; Ex. 1007 at 4:34–44, 7:45–61. Both also describe similar methods of increasing speed in searching for subscriber information using a distributed database system in the form of a buffer or cache. Ex. 1006 at 8:30–37; Ex. 1007 at 8:46–55; Ex. 1003 at ¶ 101.

Reasonable expectation of success*:* As explained above, Feyerabend and Zhang relate to applying Internet Protocol to mobile communications networks. Combining Feyerabend and Zhang would have been readily accomplished, and a POSITA would have been motivated to do so with at least a reasonable expectation of success. Starting with Feyerabend, a POSITA familiar with subscriber database

searching with database buffers would have naturally sought to implement Zhang's distributed database system described by Zhang. Ex. 1003 at ¶ 102.

B. Claim 2: "The method of claim 1, wherein the step of determining whether the subscription identifier matches the subscriber record further comprises:"

1. Limitation 2.1

"querying a subscriber record cache for the subscription identifier;"

Like Feyerabend, Zhang teaches querying, searching, a subscriber record cache, called a buffer in Feyerabend and a local cache in Zhang, for the subscription identifiers. Zhang discloses "the base station first searches its local cache database 132 (FIG. 3B) to determine if the profile associated with the subscriber is already stored in the local cache database 132 of the local base station." Ex. 1007 at 8:46–49. Zhang's "local cache database" acts as a subscriber record cache when it is searched to determine a subscriber profile, it is queried for the subscription identifier. Ex. 1003 at ¶ 103.

2. Limitation 2.2

"if the subscription identifier matches the subscriber record in the subscriber record cache, adding the matching subscriber record to a list of subscriber records; and;"

See Limitation 2.2 *supra*.

3. Limitation 2.3

"if the subscription identifier does not match the subscriber record in the subscriber record cache, maintaining the subscription identifier in a list of unfound subscription identifiers."

Zhang teaches this limitation, in particular when there is no match found in the local cache, the subscriber profile must be sent to a central database, in effect a list of unfound subscription identifiers. Ex. 1003 at ¶ 105. Zhang discloses that "[i]f the particular profile associated with the subscriber is not already stored at the local base station, then the particular subscriber profile must be retrieved either from another one of the base stations 114 (retrieved via the distributed cache) or must be retrieved from the central database (retrieved via the centralized cache)." Ex. 1007 at 8:49–55.

C. Claim 3 "The method of claim 2, wherein the at least one subscription identifier matches the subscriber record in the subscriber record cache, and the step of determining whether the subscription identifier matches the subscriber record further comprises:"

1. Limitation 3.1

"for each subscription identifier in the list of unfound subscription identifiers, querying a subscriber record database;"

Zhang teaches for subscriber profiles not found in the local cache, the list of unfound subscription identifiers, searching a central database, querying the

subscriber record database. Zhang discloses that "[i]f the particular profile associated with the subscriber is not already stored at the local base station, then the particular subscriber profile must be retrieved either from another one of the base stations 114 (retrieved via the distributed cache) or must be retrieved from the central database (retrieved via the centralized cache)." Ex. 1007 at 8:49–55; *see supra* Limitation 2.3.

2. Limitation 3.2

"for each subscription identifier in the list of unfound subscription identifiers, . . . if the subscription identifier matches the subscriber record in the subscriber record database, adding the matching subscriber record to the subscriber record cache; and"

Zhang teaches adding any subscriber record not found in the local cache to the local cache when the record is retrieved from the base station. Zhang discloses that "[a]fter the base station retrieves the particular subscriber profile, the base station performs an authentication procedure on the subscriber, and assuming that it passes the authentication procedure, the subscriber is then registered on the network. The local base station becomes the 'owner' of the profile, and the profile is stored in the local cache database 132 of the base station if it was not previously stored locally." Ex. 1007 at 8:56–63.

3. Limitation 3.3

"for each subscription identifier in the list of unfound subscription identifiers, . . . returning an error message."

While Zhang does not teach sending an error message, Feyerabend does. *See* limitation 3.3 *supra*. In adding the caching system of Zhang to the database management system of Feyerabend, it would have been obvious to a POSITA to keep the error message taught in Feyerabend as it is performed at the interface with the cache. Ex. 1003 at ¶ 108. Such error messages are well known technique of programming, taught to computer science majors for decades, and thus any POSITA would understand to implement one in this situation. Ex. 1003 at ¶ 108.

D. Claim 4 "The method of claim 2, wherein the subscriber record cache does not include the subscriber record matching any subscription identifier, the method further comprising:"

1. Limitation 4.1

"for each subscription identifier: querying a subscriber record database, and"

Zhang discloses that "[i]f the particular profile associated with the subscriber is not already stored at the local base station, then the particular subscriber profile must be retrieved either from another one of the base stations 114 (retrieved via the distributed cache) or must be retrieved from the central database (retrieved via the centralized cache)." Ex. 1007 at 8:49–55; *see supra* Limitation 2.3.

2. Limitation 4.2

"for each subscription identifier: . . . if the subscriber record database contains the subscriber record matching the subscription identifier, adding the matching record to the subscriber record cache."

Zhang discloses that "[a]fter the base station retrieves the particular subscriber profile, the base station performs an authentication procedure on the subscriber, and assuming that it passes the authentication procedure, the subscriber is then registered on the network. The local base station becomes the 'owner' of the profile, and the profile is stored in the local cache database 132 of the base station if it was not previously stored locally." Ex. 1007 at 8:56–63.

E. Claim 5: "The method of claim 3, further comprising:"

1. Limitation 5.1

"clearing the subscriber record cache when there is a change to the subscriber record database.;"

Zhang teaches clearing the local cache when there a node is withdrawn, a change to the subscriber record database. Zhang discloses that "[t]he cache alignment process allows a cache entry and/or a node to be withdrawn." Ex. 1007 at 19:26–28. Zhang teaches this is done when "conditions in the network . . . change that would result in either cache entry change or more drastically a logical node is dead." *Id*. at 25–27.

F. Claim 15 "The non-transitory machine-readable storage medium of claim 14, wherein the instructions for determining whether the subscription identifier matches the subscriber record further comprise:"

1. Limitation 15.1

"instructions for querying a subscriber record cache for the subscription identifier;"

See Limitation 2.1 *supra*. Further, Zhang teaches "implement[ing] as software instructions executed by the base station computer system" the method it discloses. Ex. 1007 at 30:10–15. A POSITA would have found it obvious to implement all the teachings of Zhang and Feyerabend on non-transitory machine-readable storage medium. Ex. 1003 at ¶ 112.

2. Limitation 15.2

"instructions for adding the matching subscriber record to a list of subscriber records if the subscription identifier matches the subscriber record in the subscriber record cache; and"

See Limitation 2.2 *supra*.

3. Limitation 15.3

"instructions for adding the subscription identifier to a list of unfound subscription identifiers if the subscription identifier does not match the subscriber record in the subscriber record cache."

See Limitation 2.3 *supra*.

G. Claim 16 "The non-transitory machine-readable storage medium of claim 15, wherein at least one subscription identifier matches the subscriber record in the subscriber record cache, and the instructions for determining whether the subscription identifier matches the subscriber record further comprise:"

1. Limitation 16.1

"instructions for querying a subscriber record database for each subscription identifier in the list of unfound subscription identifiers to determine whether the subscription identifier matches the subscriber record in the subscriber database; and"

See Limitation 3.1 *supra*.

2. Limitation 16.2

"instructions for adding the matching subscriber record to the subscriber record cache and returning an error message if the subscription identifier matches the subscriber record in the subscriber record database."

See Limitations 3.2, 3.3 *supra*.

H. Claim 17 "The non-transitory machine-readable storage medium of claim 16, further comprising:"

1. Limitation 17.1

"instructions for clearing the subscriber record cache when there is a change to the subscriber record database."

See Limitation 5.1 *supra*.

I. Claim 18 "The non-transitory machine-readable storage medium of claim 15, wherein the subscriber record cache contains no subscriber records matching any subscription identifier, the machine-readable storage medium further comprising:"

1. Limitation 18.1

"instructions for querying a subscriber record database for each subscription identifier; and"

See Limitation 4.1 *supra*.

2. Limitation 18.2

"instructions for adding a matching record to the subscriber record cache if the subscriber record database contains the subscriber record matching the subscription identifier."

See Limitation 4.2 *supra*.

XII. GROUND 3: FEYERABEND, 3GPP, AND BLAND RENDER CLAIMS 7 AND 20 OBVIOUS

Petitioner provides this third ground adding the error scenario when multiple matching subscriber records are found from Bland to the error mechanism of Feyerabend as applied to the framework of 3GPP. While Feyerabend describes using an error message when no record can be found, it does so when more than one subscriber record is found and sending an error message accordingly. A POSITA would recognize that both finding no record and finding too many records to be problematic and would thus be motivated to apply the error recognition of Bland to

the search mechanism and error response of Feyerabend. Indeed, such error messages are such a well-known technique, a POSITA have found it obvious to add such an error message to the 3GPP Feyerbend combination of ground 1 based on Feyerbend alone, as such an error message would be trivial to implement, would have been nothing more of a mere design choice, and would have made the proposed combination more robust and easier to troubleshoot.

A. Motivation to Combine

As briefly set out above, a POSITA would have been motivated to modify the error response described in Feyerabend to recognize the multiple-record error described in Bland. Because both Feyerabend and Bland discuss managing subscriber databases. Ex. 1008 at Abstract; Ex. 1006 at Abstract. A POSITA would have recognized that errors occur in searching subscriber databases and mechanisms need to be in place to recognize and flag those error. Ex. 1003 at ¶ 120. Feyerabend already recognizes this need and provides a mechanism in the case of no record being found. Ex. 1006 at 8:32–35. A POSITA would have found it obvious to add the additional error types from Bland to the error response of Feyerabend. Ex. 1003 at ¶ 120.

As set forth below, Feyerabend, 3GPP, and Bland render claims 7 and 20 obvious based on the disclosure of Feyerabend and 3GPP of claim 1 and 14 as set forth above. A POSITA would have further found it obvious to combine the teaching

of these three references because they all address the same field of endeavor, use similar techniques to solve the same problem, and provide a reasonable expectation of success.

Same field of endeavor*:* Feyerabend and Bland are both directed to solving problems associated with managing subscriber information using subscription identifiers in a mobile network. Bland is directed to "a problem associated with integrating [subscriber] data for a plurality of application into a common database." Ex. 1008 at ¶ [0008]. Feyerabend similarly is directed to an "application server run[ning] one or more applications providing one or more push services" related to subscriber data. Ex. 1006 at 6:29–39.

Additionally, both Feyerabend and Bland describe managing legacy subscriber information in an evolving mobile network. Ex. 1006 at 1:19–30; Ex. 1008 at ¶ [0008].

Similar techniques to solve the same problems*:* Feyerabend and Bland both describe using error messages when unexpected results are obtained. Ex. 1006 at 8:34; Ex. 1008 at ¶¶ [0070–73]. In particular, Feyerabend describes that when a "subscriber identity is not available" in the location searched sending "a negative acknowledgement." Ex. 1006 at 8:33–35. Bland teaches a very similar error recognition mechanism but for a different error. First, Bland recognizes the same error as Feyerabend, "the subscriber identity does not exist" this results in the request

being rejected. Ex. 1008 at ¶ [0070]. Second, Bland recognizes the situation when "the IMSI[, the subscriber identity,] is shared" and special actions must be taken accordingly. Ex. 1008 at ¶ [0073]. A POSITA would have recognized the similarity of the techniques taught in Feyerabend and Bland and would have thus found it obvious to modify the error mechanism of Feyerabend with the error scenario disclosed by Bland. Ex. 1003 at ¶ 124.

Reasonable expectation of success: As explained above, Feyerabend and Bland both describe a near-identical error response mechanisms. Further, both Feyerabend and Bland relate to the similar data management systems. A POSITA would have a reasonable expectation of success in combining similar mechanisms in similar systems. Ex. 1003 at ¶ 125.

B. Claim 7: "The method of claim 1, further comprising:"

1. Limitation 7.1

"returning an error message when the subscription identifiers match more than one subscriber record."

Bland discloses "a provisioning client determines that the IMSI is shared." Ex. 1008 at ¶ [0073]. While Bland does not disclose sending an error message in this specific scenario, Bland teaches during rejecting a request in the same section, describing a "scenario A" instead of the "scenario C" describing a shared subscription identifier, IMSI. *Id.* at ¶ [0070]. A POSITA would have found it

obvious to return an error message in each of the described scenarios. Ex. 1003 at ¶ 126.

C. Claim 20: "The non-transitory machine-readable storage medium of claim 14, further comprising:"

2. Limitation 20.1

"returning an error message when the subscription identifiers match more than one subscriber record."

See claim 7 *supra*.

XIII. CONCLUSION

For at least the foregoing reasons, this Petition should be instituted.

DATED: November 8, 2021 */s/ James Glass*
James Glass (Reg. No. 46729)

CERTIFICATION UNDER 37 C.F.R. § 42.24

Under the provisions of 37 C.F.R. § 42.24, the undersigned hereby certifies that the word count for the foregoing Petition for *inter partes* review (excluding the table of contents, table of authorities, mandatory notices, certificate of service or word count, and appendix of exhibits or claim listing) totals 10,543 words, which is within the word limit allowed under 37 C.F.R. § 42.24(a)(i).

Date: November 8, 2021

/s/ James Glass
James Glass (Reg. No. 46729)

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. §§ 42.6(e), 42.105(a), the undersigned hereby certifies service on the Patent Owner of a copy of this Petition and its respective exhibits at the official correspondence address for the attorney of record for the '827 Patent as shown in USPTO PAIR via FedEx:

Kramer & Amado, P.C.
225 Reinekers Ln, Suite 300
Alexandria, VA 22314

Additionally, a copy of this Petition and its respective exhibits were served via FedEx to the following address:

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Courtesy copies were also sent via electronic mail to Patent Owner's counsel of record in the related district court proceeding, Case No. 6:20-cv-01167-ADA (W.D. Tex.) at the following addresses:

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